

March 2021

**PROCESS INSTRUMENTATION FUNDAMENTALS**

Time Allowed: 3 Hours

Full Marks: 70

Answer to Question No.1 is compulsory and Answer any five questions from the rest.

1. Fill in the blanks (any twenty): 1x20
- i) Barometers can measure \_\_\_\_\_ pressure.
  - ii) Thermal conductivity of material depend on \_\_\_\_\_.
  - iii) Orifice meter is used to measure \_\_\_\_\_ flow rate of fluid through pipeline.
  - iv) Thermal conductivity of material depend on \_\_\_\_\_.
  - v) McLeod Gauge is used to measure of \_\_\_\_\_.
  - vi) \_\_\_\_\_ cell is used for measuring the conductivity of liquid.
  - vii) The positive terminal wire of K-type thermocouple is \_\_\_\_\_.
  - viii) Optical pyrometer is generally used for \_\_\_\_\_ temperature.
  - ix) Resistance thermometer works on the principle of \_\_\_\_\_.
  - x) Diffusivity of gas depends upon \_\_\_\_\_.
  - xi) Hot wire anemometer measures \_\_\_\_\_ flow rate of a liquid in a principle.
  - xii) Thermistor is used for \_\_\_\_\_ measurement.
  - xiii) A manometer usually measures \_\_\_\_\_.
  - xiv) Very high temperature is measure by \_\_\_\_\_.
  - xv) Thermopile is used to measure \_\_\_\_\_.
  - xvi) LVDT can be used to measure \_\_\_\_\_.
  - xvii) Conductivity of solid can be measured by \_\_\_\_\_.
  - xviii) Burdon tube has \_\_\_\_\_ cross section.
  - xix) \_\_\_\_\_ effect is used in thermocouple.
  - xx) Pirani gauge is used to measure \_\_\_\_\_ pressure.
  - xxi) Thermal conductivity of gas can be measure by \_\_\_\_\_.
  - xxii) Resistance thermometer works on the principle of \_\_\_\_\_.
  - xxiii) Diaphragm can be able to measure \_\_\_\_\_.
  - xxiv) \_\_\_\_\_ cell is used for the measurement of the conductivity of liquid.
  - xxv) Hot wire anemometer measures \_\_\_\_\_ flow rate of a fluid in a pipeline.
2. Write short note on **any two** of the followings: 2x5
- a) LVDT
  - b) Diaphragm
  - c) Piezo electric transducer
3. Describe the working principle of a thermocouple. Write some disadvantage of it. 7+3
4. Write short note on **any two** of the followings: 2x5
- a) Thermistor
  - b) IPTS
  - c) Bimetallic thermometer
5. With a net sketch write the working principle of hot wire anemometer in flow measurement. Write some advantage of it. 7+3
6. Write some application of magnetic flow meter. Write short note on level control. 5+5
7. Define thermal conductivity and diffusivity. How will you measure thermal conductivity of a solid food? 5+5

8. Write the working principle of radiation pyrometer. Write some advantage and disadvantage of it. 6+4
  9. What is gauge pressure and absolute pressure? With a net sketch write the working principle of capsule and pirani gauge. 2+(4+4)
  10. Describe the working principle of McLeod gauge. Write some use of it. 7+3
  11. With a net sketch write the working principle of resistance thermometer. Write some advantage of it. 7+3
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